Cosmic Chemistry: Planetary Diversity

Solar Nebula Supermarket

TEACHER GUIDE: POWERPOINT PRESENTATION

BACKGROUND INFORMATION


NASA

The PowerPoint presentations that are provided as Genesis Educational Technology Applications should be used as a supplement to the student texts from which they were derived. They offer an alternative way of assisting student learning of information contained in the text.

In constructing PowerPoint presentations, adding too much text to the slide is not visually pleasing to the student. However, the sharing of the slide notes is vital for complete understanding of the concepts, so it is provided as notes to the teacher. Therefore it is important to read and print out the slides and the teacher talking points that accompany them.

While showing the slides to your students, we encourage you to use the teacher talking points that accompany the slides, so that you are prepared to actually present the information. Ask the students to consider the graphics that are on each slide. The images and graphs that accompany the text will generate questions that can be explored further, either in the student text itself or with additional research.

NATIONAL SCIENCE STANDARDS ADDRESSED

Teaching Standards

Teaching Standard A: Teachers of science plan an inquiry-based science program for their students

Select science content and adapt and design curricula to meet the interests, knowledge, understanding, abilities and experiences of students.

Select teaching and assessment strategies that support the development of student understanding and nurture a community of science learners.

Teaching Standard B: Teachers of science guide and facilitate learning

Focus and support inquiries while interacting with students.

Orchestrate discourse among students about scientific ideas.

Encourage and model the skills of scientific inquiry, as well as the curiosity, openness to new ideas, and skepticism that characterize science.

Teaching Standard D: Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science.

Create a setting for student work that is flexible and supportive of science inquiry.

Make the available science tools materials, media, and technological resources accessible to students.

Content Standards

Grades 9-12

Science As Inquiry

Abilities necessary to do scientific inquiry

Understandings about scientific inquiry

Earth and Space Science

Earth in the solar system

The origin and evolutions of the Earth system
The origin and evolution of the universe
Energy in the Earth system
Geochemical cycles

Physical Science

Properties and changes of properties in matter
Motions and forces
Transfer of energy
Interactions of matter and energy

Science and Technology

Understandings about science and technology

History and Nature of Science

Science as a human endeavor
Nature of science and scientific knowledge
History of science and historical perspectives

(View a full text of the National Science Education Standards.)

MATERIALS

For the Teacher

- Computer with Microsoft® PowerPoint application
- Computer projector or overhead projector with LCD Panel
- "Solar Nebula Supermarket" PowerPoint presentation

For each student

- Copy of Student Text, "Solar Nebula Supermarket"

PROCEDURE

- The "Solar Nebula Supermarket" student text is to be used with the "Are We Related?" activity in the Genesis science education module *Cosmic Chemistry: Planetary Diversity*. The text is first referenced in the background information of the teacher guide. The background information shows how the Genesis mission will provide precise solar abundances in order to test theories of the origins of the diverse objects in the solar system. The PowerPoint presentation "Solar Nebula Supermarket" can be used to accompany the student text.

- You may want to use this PowerPoint presentation with your students after they have had a chance to read over the student text one time and before they have attempted questions 8-10 on the student activity "Are We Related?" The presentation should help to identify questions the students may have about the solar nebula and the condensation theory is recommended that the students refer to a hard copy of the "Solar Nebula Supermarket" student text during the PowerPoint presentation in order to more easily view the graphs and charts that are illustrated on the screen. For slides 8, 13, 17 and 22 it is necessary for students to have the student text on hand to be able to refer to the specific information on these graphics.

- In the student activity "Are We Related?" students are instructed to study the "Solar Nebula Supermarket" text and Appendix A, "The Solar System or Do Nine Planets a Baseball Team Make?" as they begin to work on Part 2 of the activity. During Part 2, students will be using these texts to look for evidence that supports the theory that the nine planets, among other highly diverse objects of our solar system, originated from condensation of a relatively homogeneous solar nebula. They will be looking for specific data from the activity that does *not* appear to be explained by the condensation theory. Students will also be listing other information that they would need to make a decision about this theory. Finally, students will be looking for evidence that supports Pluto's classification either as a planet or a "Trans-Neptunian Object."

- Once students have had a chance to address the questions on the student activity “Are We Related?” hold a class discussion using questions found in the teacher guide procedure 12.

TEACHER RESOURCES

http://www.genesismission.org/educate/kitchen/techappl/invigor.html
Invigorate your presentations